CLAIMS

1. Stealth lipid nanocapsules consisting of an essentially lipid core which is liquid or semi-liquid at ambient temperature, and an outer lipid envelope comprising at least one hydrophilic surfactant which is lipidic in nature, at least one lipophilic surfactant which is lipidic in nature and at least one amphiphilic derivative of poly(ethylene glycol), wherein the molar mass of the poly(ethylene glycol) component is greater than or equal to 1 000 g/mol.

2. The stealth lipid nanocapsules according to Claim 1 wherein the molar mass of the poly(ethylene glycol) component is greater than or equal to 2 000 g/mol.

3. The stealth lipid nanocapsules according to Claim 1 or 2, wherein said lipophilic surfactant is a lecithin, the phosphatidylcholine proportion of which is at least equal to 95%, preferably greater than 99%.

4. The stealth lipid nanocapsules according to any of Claims 1 to 3, wherein said lipophilic surfactant has a gel/liquid transition temperature of at least equal to 25°C, preferably greater than 37°C.

5. The stealth lipid nanocapsules according to any of Claims 1 to 4, wherein the lipophilic surfactant is a phospholipid comprising acyl chains of at least 16 carbon atoms.

6. The stealth lipid nanocapsules according to Claim 5, wherein said lipophilic surfactant is selected from the group consisting of HSPC (hydrogenated soy phosphatidylcholine), DSPC (distearoylphosphatidylcholine) and DPPC (dipalmitoylphosphatidylcholine), and also mixtures thereof.

7. The stealth lipid nanocapsules according to any of Claims 1 to 6, wherein said lipophilic surfactant represents between 5 and 30 mol% of the molecules making up said outer lipid envelope.

8. The stealth lipid nanocapsules according to any of Claims 1 to 7, wherein said hydrophilic surfactant is selected from the group consisting of poly(ethylene glycol) alkyl esters and poly(ethylene glycol) alkyl ethers, and also mixtures thereof.

9. The stealth lipid nanocapsules according to Claim 8, wherein said hydrophilic surfactant is a nonionic surfactant of the poly(ethylene glycol)-660 12-hydroxystearate type comprising a chain of 15 units of ethylene glycol.

10. The stealth lipid nanocapsules according to any of Claims 1 to 9, wherein said hydrophilic surfactant represents between 60 and 90 mol% of the molecules making up said outer lipid envelope, preferably 80 mol%.

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11. The stealth lipid nanocapsules according to any of Claims 1 to 10, wherein said amphiphilic derivative of poly(ethylene glycol) comprises a hydrophobic component which allows it to be anchored in said outer lipid envelope and a hydrophilic component of the poly(ethylene glycol) type facing the outside of said lipid nanocapsules, conferring hydrophilic properties at the surface thereof.

12. The stealth lipid nanocapsules according to any of Claims 1 to 11, wherein said amphiphilic derivative of poly(ethylene glycol) is chosen from biodegradable phospholipids.

13. The stealth lipid nanocapsules according to Claim 12, wherein said biodegradable phospholipids are selected from the group consisting of

DPPE-PEG_x (dipalmitoylphosphatidylethanolamine),

DSPE-PEG_x (distearoylphosphatidylethanolamine),

DOPE-PEG_x (dioleoylphosphatidylethanolamine), and

POPE-PEG_x (palmitoyloleylphosphatidylethanolamine),

in which x is greater than or equal to 1 000 g/mol, and also mixtures thereof.

14. The stealth lipid nanocapsules according to Claim 13, wherein said biodegradable phospholipids are selected from the group consisting of DSPE-PEG_{2000}, DSPE-PEG_{3000} and DSPE-PEG_{5000}, and also mixtures thereof.

15. The stealth lipid nanocapsules according to any of Claims 1 to 14, wherein said amphiphilic derivative of poly(ethylene glycol) represents between 0.5 and 12 mol% of the molecules making up said outer lipid envelope, preferably between 1 and 10 mol%.

16. The stealth lipid nanocapsules according to any of Claims 1 to 15, wherein said essentially lipid core represents between 20 and 60% by weight relative to the total weight of said nanocapsules, preferably between 25 and 50% by weight relative to the total weight of said nanocapsules.

17. The stealth lipid nanocapsules according to any of Claims 1 to 16, wherein said essentially lipid core is composed of fatty acid esters and/or of triglycerides and/or of oil, and/or mixtures thereof.

18. The stealth lipid nanocapsules according to Claim 17, wherein the triglycerides making up said essentially lipid core are chosen from the medium chain triglycerides carrying from 6 to 14 carbon atoms, caprylic/capric triglycerides, and mixtures thereof.

19. The stealth lipid nanocapsules according to Claim 17, wherein the fatty acid esters making up said essentially lipid core are selected from the group consisting of

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medium chain fatty acids carrying from 8 to 18 carbon atoms.

20. The stealth lipid nanocapsules according to Claim 19, wherein the fatty acid esters making up said essentially lipid core are selected from the group consisting of ethyl palmitate, ethyl oleate, ethyl myristate, isopropyl myristate, octyldodecyl myristate, and mixtures thereof.

21. The stealth lipid nanocapsules according to any of Claims 1 to 20, being between 50 and 150 nm, in diameter, preferably between

80 and 120 nm, in diameter.

22. The stealth lipid nanocapsules according to any of Claims 1 to 21, wherein the outer surface of said outer lipid envelope is hydrophilic in nature, and the essentially lipid core is lipophilic in nature.

23. The stealth lipid nanocapsules according to any of Claims 1 to 22, carrying at their surface specific ligands which confer upon them the ability to actively target cells having receptors for these ligands, in particular tumor cells.

24. The stealth lipid nanocapsules according to Claim 23, wherein said ligand is selected from the groups consisting of the saccharide, oligosaccharide, vitamin, oligopeptide, antibody fragment and monoclonal antibody type.

25. The stealth lipid nanocapsules according to any of Claims 1 to 24, having a half-life of at least 2 hours in the blood compartment of the host to which they are administered.

26. The stealth lipid nanocapsules according to any of Claims 1 to 25, being able to rapidly release most of their contents by biodegradation, and in particular by enzymatic digestion.

27. The stealth lipid nanocapsules according to any of Claims 1 to 26, containing one or more active principles.

28. The stealth lipid nanocapsules according to Claim 27, containing one or more anticancer active principles which are mainly lipophilic in nature.

29. The stealth lipid nanocapsules according to Claim 28 wherein the anticancer active principles are selected from the group consisting of paclitaxel and derivatives thereof, such as docetaxel, camptothecin and derivatives thereof, such as irinotecan, topotecan, rubitecan, and busulfan, chlorambucil, phthalocyanins, carotenoids and daunomycin.

30. The stealth lipid nanocapsules according to Claim 27, containing one or more anticancer active principles which are amphiphilic in nature.

31. The stealth lipid nanocapsules according to Claim 30, wherein the

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anticancer active principles are selected from the group consisting of cytarabine, cyclophosphamide, methotrexate, fluoro derivatives, such as 5-fluorouracil or 5-fluorouridine, and doxorubicin.

32. The stealth lipid nanocapsules according to Claim 27, containing one or more active principles selected from the group consisting of anti-inflammatories, corticoids, antibiotics, analgesics and anti-infectious agents.

33. The stealth lipid nanocapsules according to Claim 32 containing dexamethasone, indomethacin, ibuprofen, ketoprofen, ketoconazole, prostaglandin E1 or amphotericin B.

34. A method for preparing the nanocapsules according to any of Claims 1 to 33, comprising preformating nanocapsules lacking amphiphilic derivative of poly(ethylene glycol), and then post-inserting said amphiphilic derivatives of poly(ethylene glycol) into the surface of these nanocapsules.

35. The method according to Claim 34, wherein said preformation step comprises the synthesis of nanocapsules lacking amphiphilic derivative of poly(ethylene glycol), according to the phase inversion of an oil/water emulsion brought about by several cycles of increase and decrease in temperature.

36. The method according to Claim 34, wherein said post-insertion step comprises a first step of coincubation of the preformed nanocapsules in the presence of the amphiphilic derivative of poly(ethylene glycol), and then a second "quenching" step during which the amphiphilic derivative of poly(ethylene glycol)/preformed nanocapsules mixture thus obtained is abruptly cooled so as to reach a temperature of between 0 and 5°C.

37. The method according to Claim 36, wherein the step of coincubation of the amphiphilic derivative of poly(ethylene glycol)/preformed nanocapsules mixture is carried out at a temperature very slightly higher than the gel/liquid phase transition temperature of said lipophilic surfactant which is lipid in nature, but lower than the phase inversion temperature of the amphiphilic derivative of poly(ethylene glycol)/ preformed nanocapsules mixture.

38. The method according to any of Claims 34 to 37, wherein the diameter of the nanocapsules is adjusted by adjusting the proportion and the length of the hydrophilic chains of the amphiphilic derivative when it is introduced in the post-insertion step.

39. A method for preparing the nanocapsules according to any of Claims 1 to 33, wherein the diameter of the nanocapsules is adjusted by adjusting the proportions

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of salt and of hydrophilic surfactant, and the purity of the lipophilic surfactant, in the starting mixture of the conventional method of synthesis.

40. The method according to any of Claims 34 to 39, being free of any organic solvent and using only biodegradable compounds approved for parenteral use.

41. The method according to any of Claims 34 to 40, wherein said nanocapsules are sterilized by sterilizing filtration through a filter with a diameter of 0.45 µm to 0.22 µm.

42. The method according to any of Claims 34 to 41, wherein said nanocapsules are lyophilized and then reconstituted extemporaneously in the form of a colloidal suspension.

43. A pharmaceutical composition comprising the lipid nanocapsules according to any of Claims 1 to 33.

44. The pharmaceutical composition according to Claim 43, being in the form of a colloidal aqueous suspension containing said lipid nanocapsules.

45. Use of the lipid nanocapsules according to any of Claims 27 to 31 for the preparation of a medicament for the treatment of cancers, in particular solid or circulating tumors, by intravenous administration.

46. The use according to Claim 45, for the preparation of a medicament for treating circulating or solid tumors by active targeting.

47. The use according to Claim 45, for the preparation of a medicament for treating solid tumors by passive targeting subsequent to the extravasation of said nanocapsules through the tumor capillaries.

48. Use of the lipid nanocapsules according to claim 32 or 33 for the preparation of a medicament for treating inflammations and/or infections of tissues.

49. The use according to any of Claims 45 to 48, wherein the medicinal product is intended to be administered parenterally, or injected into the circulation of a subject intravascularly, in particular intravenously or intra-arterially, intraperitonealy, intramuscularly, subcutaneously or intra-articularly.

50. Use of the nanocapsules according to any of Claims 1 to 26, for the preparation of a medicament for taking up hydrophobic molecules present in the blood circulation subsequent to an instance of poisoning.

51. The use according to any of claims 45 to 50, characterized in that the toxicity of the active principle(s) against the healthy tissues is reduced.

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